**3GPP TSG-CT WG3 Meeting #142 *C3-253040***

**Gothenburg, SE, 25 - 29 August 2025**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.507** | **CR** | **0344** | **rev** | **-** | **Current version:** | **19.3.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Completion of S-NSSAI replacement functionality in AMPolicyControl procedures | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Verizon, Ericsson, Nokia, Oracle | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI19, eNS\_Ph3 | | | | |  | ***Date:*** | | | 2025-07-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Stage 2 Technical Specifications include the following functionality that is still missing at stage 3 level:   * PCF becomes aware of the UE support to S-NSSAI replacement functionality at AM Policy Control Association establishment. * PCF may deduce that one or more S-NSSAIs become unavailable or available again based on interaction with the NWDAF for slice load level information analytics. * Interaction with the PCF occurs if the AMF is not able to deduce the alternative S-NSSAIs from the NSSF or based on local configuration.   For the first topic, CT3 has already discussed during last year the need for a specific indicator defined at stage 2 level and objections to that solution have prevented to agree on it.  As described in the Discussion Paper in C3-253031, large network operators find necessary to specify a solution to prevent signalling storms from the PCF notifying all the UEs about network slice replacement.  In order to allow other kind of implementations, the UE capability is introduced under feature control. | | | | | | | | |
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| ***Summary of change:*** | | Clause 2 is updated to add TS 29.520 as a reference.  Clause 4.2.3.1 is updated to show the conditions for the AMF to interact with the PCF during AM Plocy Control Update procedure  Clause 4.2.4.2 is updated to clarify how the PCF can deduce the slice availability based on interaction with the NWDAF.  Clause 5.8 is updated to enhance the NetSliceRepl feature description. | | | | | | | | |
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| ***Consequences if not approved:*** | | Wrong impacts bring interoperability issues. Misalignment with stage 2. | | | | | | | | |
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| ***Clauses affected:*** | | 2; 4.2.2.1; 4.2.3.1; 4.2.4.2; 5.6.1; 5.6.2.3; 5.6.3.5; 5.8; A.2. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces backwards compatible correction to the OpenAPI description of the  TS29507\_Npcf\_AMPolicyControl.yaml | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* First Change \*\*\*

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[4] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[5] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[6] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[7] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping; Stage 3".

[8] IETF RFC 9113: "HTTP/2".

[9] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[10] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.

[11] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[12] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[13] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[14] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[15] void.

[16] void.

[17] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository service for Policy Data, Application Data and Structured Data for Exposure; Stage 3".

[18] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[19] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[20] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[21] IETF RFC 9457: "Problem Details for HTTP APIs".

[22] 3GPP TR 21.900: "Technical Specification Group working methods".

[23] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[24] 3GPP TS 29.531: "5G System; Network Slice Selection Services; Stage 3".

[25] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[26] 3GPP TS 29.534: "5G System; Access and Mobility Policy Authorization Service; Stage 3".

[27] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[28] 3GPP TS 29.523: "5G System; Policy Control Event Exposure Service; Stage 3".

[29] 3GPP TS 29.525: "UE Policy Control Service; Stage 3".

[30] 3GPP TS 29.521: "5G System; Binding Support Management Service; Stage 3".

[31] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[32] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[33] 3GPP TS 29.594: "5G System; Spending Limit Control Service; Stage 3".

[34] 3GPP TS 32.256: "Charging management; 5G connection and mobility domain charging; stage 2".

[35] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[36] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

\*\*\* Second Change \*\*\*

4.2.3.1 General

The procedure in the present clause is applicable when the NF service consumer modifies an existing AM policy association (including the case where the AMF is relocated and the new AMF selects the old PCF to maintain the policy association and to update the Notification URI).

Figure 4.2.3.1-1 illustrates the update of a policy association.

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**Figure 4.2.3.1-1: Update of a policy association**

The AMF as NF service consumer invokes this procedure when a policy control request trigger (see clause 4.2.3.2) occurs. When a policy control request trigger that does not require the subscription as defined in table 5.6.3.3-1 (e.g. Service Area Restriction change trigger) occurs, the NF service consumer (e.g. AMF) shall always invoke the procedure. When a policy control request trigger requires the subscription as defined in table 5.6.3.3-1 (e.g. location change trigger) occurs, the NF service consumer shall only invoke the procedure if the PCF has subscribed to that event trigger.

If an AMF knows by implementation specific means that the UE context has been transferred to an AMF with another GUAMI within the AMF set, it may also invoke this procedure to update the Notification URI and the GUAMI.

NOTE 1: Either the old or the new AMF can invoke this procedure.

During the AMF relocation, if the new AMF received the resource URI of the individual AM Policy from the old AMF and selects the old PCF, the new AMF shall also invoke this procedure to update the Notification URI and the GUAMI. The new AMF may also update the alternate or backup IP addresses. If the feature "FeatureRenegotiation" is supported, the new AMF may perform feature renegotiation, as described in clause 4.2.3.4.

To request policies from the PCF, to update the Notification URI, to renegotiate features, to update the trace control configuration and/or to request the termination of trace, the NF service consumer (e.g. AMF) shall request the update of the AM Policy Association by providing the relevant parameters about the UE context by sending an HTTP POST request with "{apiRoot}/npcf-am-policy-control/v1/policies/{polAssoId}/update" as Resource URI and the PolicyAssociationUpdateRequest data structure as request body that shall include:

- at least one of the following:

1. a new Notification URI encoded in the "notificationUri" attribute;

2. observed Policy Control Request Trigger(s) (see clause 4.2.3.2) encoded as "triggers" attribute;

3. if a Service Area restriction change occurred, the Service Area Restrictions (see clause 4.2.2.3.1) as obtained from the UDM encoded as "servAreaRes" attribute;

4. if a RFSP index change occurred, the RFSP index (see clause 4.2.2.3.2) as obtained from the UDM encoded as "rfsp" attribute;

5. if a UE location change occurred and the Policy Control Request Trigger "Location change" was provided, the UE location encoded as "userLoc" attribute;

6. if the Policy Control Request Trigger "Change of UE presence in PRA" was provided, the current presence status of the UE for the presence reporting areas for which reporting was requested, if not previously provided, or the presence reporting areas for which reporting was requested and the status has changed encoded as "praStatuses" attribute;

NOTE 2: If the PCF included the identifer of a Core Network predefined Presence Reporting Area Set within the "praId" attribute during the subscription to changes of UE presence in PRA, the AMF only provides the presence reporting area information corresponding to the concerned individual Presence Reporting Area Identifier(s) within the Set. The "praId" attribute within each returned "PresenceInfo" data type hence includes the identifier of the concerned individual Presence Reporting Area.

7. if the trace control configuration needs to be updated, trace control and configuration parameters information encoded as "traceReq" attribute;

8. if trace needs to be terminated, the "traceReq" attribute set to the Null value;

9. if the "SliceSupport" feature, the "DNNReplacementControl" feature and/or the "NetSliceRepl" feature is/are supported, the UE is registered via 3GPP access, the Allowed NSSAI changed, and the Policy Control Request Trigger "Change of Allowed NSSAI" was provided, then the Allowed NSSAI within the "allowedSnssais" attribute;

10. for AMF relocation scenarios, if available, alternate or backup IPv4 Address(es) where to send Notifications encoded as "altNotifIpv4Addrs" attribute;

11. for AMF relocation scenarios, if available, alternate or backup IPv6 Address(es) where to send Notifications encoded as "altNotifIpv6Addrs" attribute;

12. for AMF relocation scenarios, if available, alternate or backup FQDN(s) where to send Notifications encoded as "altNotifFqdns" attribute;

13. for AMF relocation scenarios, the GUAMI encoded as "guami" attribute;

NOTE 3: An alternate NF service consumer than the one that requested the generation of the subscription resource can send the request. For instance, an AMF as service consumer can change.

14. if the feature "UE-AMBR\_Authorization" is supported, and a subscribed UE-AMBR change occurred, the UE-AMBR (see clause 4.2.2.3.3) as obtained from the UDM encoded as "ueAmbr" attribute;

15. if the feature "DNNReplacementControl" is supported, DNN replacement applies and the Policy Control Request Trigger "Change of SMF selection information" was provided, the "smfSelInfo" attribute including:

- the UE requested DNN in the "dnn" attribute; and

- the UE requested S-NSSAI in the "snssai" attribute and, if available, the corresponding mapped home S-NSSAI in the "mappingSnssai" attribute;

when:

- the UE requested an unsupported DNN and the "unsuppDnn" attribute is set to "true"; or

- the UE requested DNN and S-NSSAI matched one of the S-NSSAI and DNN provided in the "candidates" attribute;

16. if feature "DNNReplacementControl" is supported, the UE is registered via 3GPP access, the Allowed NSSAI changed and/or the mapping of a S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN changed, and the Policy Control Request Trigger "Change of allowed NSSAI" was provided, then the mapping of each S-NSSAI of the Allowed NSSAI to the corresponding S-NSSAI of the HPLMN encoded in the "mappingSnssais" attribute;

NOTE 4: When the feature "DNNReplacementControl" is supported, the AMF applies DNN replacement for non-roaming scenarios and LBO. For a PDU session with home routed roaming, whether to perform DNN replacement is based on operator agreement.

17. if feature "UE-Slice-MBR\_Authorization" is supported, and a subscribed UE-Slice-MBR change occurred, the subscribed UE-Slice-MBR for each subscribed S-NSSAI of the home PLMN mapping to a S-NSSAI of the serving PLMN (see clause 4.2.2.3.5) encoded in the "ueSliceMbrs" attribute;

18. if the feature "EneNA" is supported and an NWDAF information change occurred, the list of NWDAF instance IDs used for the UE and their associated Analytic ID(s) with the updated values within the "nwdafDatas" attribute;

NOTE 5: The NF service consumer provides the complete updated list of NWDAF instance IDs and associated Analytic ID(s) used for the UE. If all NWDAF data is deleted an empty list is included.

19. if the feature "TargetNSSAI" is supported, a new Target NSSAI is generated and the Policy Control Request Trigger "Generation of Target NSSAI" is provided, the new generated Target NSSAI encoded in the "targetSnssais" attribute;

20. if the "NetSliceRepl" feature is supported;

- if the AMF is aware that one or more S-NSSAI(s) become unavailable but cannot determine the corresponding Alternative S-NSSAI(s) (e.g., NSSF or OAM doesn't provide an Alternative S-NSSAI to the AMF and there is no Alternative S-NSSAI in the AMF local configuration) and the Policy Control Request Trigger "SLICE\_REPLACE\_MGMT" was provided, these unavailable S-NSSAI(s) within the "unavailSnssais" attribute;

- if the AMF decides to proceed with network slice replacement and is aware of the Alternative S-NSSAI(s) corresponding to those initial S-NSSAI(s) or previously replaced S-NSSAI(s) is available and the Policy Control Request Trigger "SLICE\_REPLACE\_MGMT" was provided, the AMF provides the updated "snssaiReplInfos" with the updated mapping of (replaced) S-NSSAI(s) with the Alternative S-NSSAI(s) in case of network slice replacement or by removing the mapping of the replaced S-NSSAI(s) with the Alternative S-NSSAI(s) if the replaced S-NSSAI(s) is available;

21. if "PartNetSliceSupport" feature and/or "NetSliceRepl" feature is/are supported, the UE is registered via 3GPP access, the Partially Allowed NSSAI changed and the Policy Control Request Trigger "Change of the Partially Allowed NSSAI" was subscribed by the PCF, then the updated Partially Allowed NSSAI within the "partAllowedNssai" attribute;

22. if the "PartNetSliceSupport" feature is supported, the UE is registered via 3GPP access, the Partially Allowed NSSAI changed and/or the mapping of one or more of the S-NSSAI(s) of the Partially Allowed NSSAI to the corresponding HPLMN S-NSSAI(s) changed, and the Policy Control Request Trigger "Change of the Partially Allowed NSSAI" was subscribed by the PCF, then the mapping of each S-NSSAI of the Partially Allowed NSSAI to the corresponding HPLMN S-NSSAI within the "mappingSnssais" attribute;

23. if the "PartNetSliceSupport" feature is supported, the UE is registered via 3GPP access and:

- if the list of the S-NSSAI(s) rejected partially in the RA changed and the Policy Control Request Trigger "Change of the S-NSSAI(s) rejected partially in the RA" was subscribed by the PCF, then the updated list of the S-NSSAI(s) rejected partially in the RA within the "snssaisPartRejected" attribute;

- if the list of the Rejected S-NSSAI(s) in the RA changed and the Policy Control Request Trigger "Change of the Rejected S-NSSAI(s)" was subscribed by the PCF, then the updated list of the Rejected S-NSSAI(s) in the RA within the "rejectedSnssais" attribute;

- if the Pending NSSAI changed and the Policy Control Request Trigger "Change of the Pending NSSAI" was subscribed by the PCF, then the updated Pending NSSAI within the "pendingNssai" attribute;

24. if the "RatTypeChange" feature is supported, and the Policy Control Request Trigger "RAT Type Change" was provided, the RAT Type encoded in the "ratTypes" attribute;

25. if the "AfNetSliceRepl" feature is supported and the "SLICE\_REPLACE\_OUTCOME" Policy Control Request Trigger was provided by the PCF, then the outcome of AF requested Network Slice replacement within the "afSliceReplOut" attribute; and

26. if the "Energy" feature is supported and the "ENERGY\_SAV\_IND\_CH" Policy Control Request Trigger was provided by the PCF, then the updated Energy Saving Indicator value within the "enrgSavInd" attribute.

Upon the reception of the HTTP POST request, the PCF shall:

- update the corresponding individual AM Policy resource based on the information provided by the NF service consumer;

- determine the applicable policy based on local policy;

- for the successful case, send a HTTP "200 OK" response with the PolicyUpdate data type as body with possible updates for that applicable policy and Policy Control Request Trigger(s) encoded as described in clause 4.2.3.3 and according to the following provisions:

a) if the PCF received the "servAreaRes" attribute in the request, Service Area Restrictions encoded as "servAreaRes" attribute;

b) if the PCF received the "rfsp" attribute in the request, RAT Frequency Selection Priority (RFSP) Index encoded as "rfsp" attribute. If the feature "RFSPValidityTime" is supported and the PCF determines to provide an RFSP index value that indicates EPC/E-UTRAN access is prioritized over 5GS access, the PCF may provide, based on operator policies, a validity time for the RFSP index value within the "rfspValTime" attribute;

c) if the feature "UE-AMBR\_Authorization" is supported and the PCF received the "ueAmbr" attribute in the request, UE-AMBR encoded as "ueAmbr" attribute;

d) if the PCF received the "smfSelInfo" attribute in the request, the "smfSelInfo" attribute encoding the PCF selected DNN in the "dnn" attribute corresponding to the S-NSSAI received in the "snssai" attribute;

NOTE 6: A PolicyUpdate data structure with only mandatory attribute(s) is included in the "200 OK" response when the PCF decides not to update the policies.

e) if the feature "UE-Slice-MBR\_Authorization" is supported and the PCF received the "ueSliceMbrs" attribute in the request, the corresponding authorized UE-Slice-MBR(s) encoded as "ueSliceMbrs" attribute;

f) if the feature "TargetNSSAI" is supported and the PCF received the "targetSnssais" attribute in the request, the RFSP Index associated with the Target NSSAI encoded as "targetRfsp" attribute;

g) if the "NetSliceUsageCtrl" feature is supported, the updated network slice usage control information (e.g., updated slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute for each on-demand S-NSSAI of the UE's Allowed NSSAI; and/or

NOTE 7: In this release of the specification, network slice usage control information provisioning/update/removal by the PCF is not supported in roaming scenarios.

h) if the "NetSliceRepl" feature is supported and the PCF received the "unavailSnssais" attribute in the request, the Alternative S-NSSAI(s) associated with the received S-NSSAI(s) within the "snssaiReplInfos" attribute containing these unavailable S-NSSAI(s), and for each unavailable S-NSSAI, the corresponding status information set to "UNAVAILABLE" and the corresponding Alternative S-NSSAI;

i) if the "Energy" feature is supported and the PCF received the "enrgSavInd" attribute in the request, the PCF may determine the related applicable policy based on the local policy.

- if errors occur when processing the HTTP POST request, apply error handling procedures as specified in clause 5.7 and according to the following provisions:

a) if the PCF is, due to incomplete, erroneous or missing information in the request, not able to provision an AM policy decision, the PCF may reject the request and include in an HTTP "400 Bad Request" response message the "cause" attribute of the ProblemDetails data structure set to "ERROR\_REQUEST\_PARAMETERS".

b) if the "ES3XX" feature is supported and the PCF (service) instance has changed, the PCF may respond with an HTTP 3xx redirect response pointing to a new PCF (service) instance as defined in clause 6.5.3.3 of 3GPP TS 29.500 [5].

If the PCF received a "traceReq" attribute, it shall perform trace procedures as defined in 3GPP TS 32.422 [18].

If the AMF received the request of removal of Service Area Restrictions and/or RFSP Index and/or UE-AMBR and/or UE-Slice-MBR(s) from the UDM, the AMF shall remove the authorized Service Area Restrictions and/or RFSP Index and/or UE-AMBR and/or UE-Slice-MBR(s) provisioned by the PCF and apply the configured Service Area Restrictions and/or RFSP Index and/or UE-AMBR and/or UE-Slice-MBR(s) at the AMF without interacting with the PCF.

If feature "DNNReplacementControl" is supported and the AMF received the update of the SMF selection information within the "smfSelInfo" attribute in the response, the AMF shall apply the updated SMF selection information to the new PDU Sessions only, i.e. already established PDU Sessions are not affected.

If the feature "AMInfluence" is supported, the PCF determines that the access and mobility policies may be influenced by the traffic of a PDU session(s), e.g. based on the received policy control request trigger(s), and local operator policies indicate the PCF for the UE shall subscribe with the PCF for the PDU session for established/terminated PDU session(s) event notifications, the PCF shall provision/update the AMF with the PCF for the UE information within the "pcfUeInfo" attribute and the complete list of S-NSSAI and DNN combinations within the "matchPdus" attribute. The AMF shall then update the affected established PDU sesssion(s), by forwarding the received PCF for the UE information for the PDU session(s) matching the new S-NSSAI and DNN combination(s) and removing the previously provided PCF for the UE information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) as defined in 3GPP TS 29.502 [31].

When the "AMInfluence" feature is supported, and the SBA binding indication information for the PCF instance changes, the PCF may update the previously provided information in the AMF. The AMF shall apply the updated PCF callback information to the new PDU Sessions only, i.e., already established PDU sessions are not affected.

If the PCF received a new GUAMI, the PCF may subscribe to GUAMI changes using the AMFStatusChange service operation of the Namf\_Communication service specified in 3GPP TS 29.518 [14], and it may use the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the obtained GUAMI and possibly service name) to query the other AMFs within the AMF set.

If the PCF received a "servAreaRes" attribute which resulted to a change of the Service Area Restrictions, it shall send notifications to any NF Service Consumer(s) (e.g. AF) that have subscribed to the related event by using the Npcf\_AMPolicyAuthorization service (see TS 29.534 [26]) and/or the Npcf\_EventExposure service ((see TS 29.523 [28]).

If the PCF received a new list of NWDAF instance IDs used for the UE and their associated Analytic IDs within the "nwdafDatas" attribute, the PCF may select those NWDAF instances based on this new list as described in 3GPP TS 29.513 [7].

If the PCF received the notification of the outcome of the AF requested Network Slice Replacement initiation or the AF requested Network Slice Replacement termination within the "afSliceReplOut" attribute, the PCF shall send notifications to any NF Service Consumer(s) (e.g., AF) that have subscribed to the related event by using the Npcf\_AMPolicyAuthorization service (see TS 29.534 [26]) and/or the Npcf\_EventExposure service (see TS 29.523 [28]).

\*\*\* Third Change \*\*\*

4.2.4.2 Policy update notification

Figure 4.2.4.2-1 illustrates the policy update notification.

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**Figure 4.2.4.2-1: policy update notification**

The PCF may decide to update policy control request trigger(s) and/or Access and Mobility policies related to an Individual AM Policy Association, e.g., in response to information provided to the PCF via external interfaces, (e.g., the Npcf\_AMPolicyAuthorization service (see 3GPP TS 29.534 [26]), notifications provided by the Npcf\_PolicyAuthorization service (see 3GPP TS 29.514 [25]), notifications received from UDR about new or updated AF requirements on Access and Mobility polices (see 3GPP TS 29.519 [17]), or in response to an internal trigger within the PCF, e.g., the activation of a pending policy counter provided via the Nchf\_SpendingLimitControl Service (see 3GPP TS 29.594 [33]). The PCF shall send for this purpose an HTTP POST request with "{notificationUri}/update" as URI (where the Notification URI was previously supplied by the NF service consumer) and the PolicyUpdate data structure as request body encoded as described in clause 4.2.3.3.

Upon the reception of the HTTP POST request, the NF service consumer shall enforce the received updated policy.

In case of a successful update notification:

- if the feature "ImmediateReport" is supported and the PCF provisioned policy control request triggers as defined in Table 5.6.2.9-1, a "200 OK" response code and a response body with the corresponding available information in the "AmRequestedValueRep" data structure shall be returned in the response;

- otherwise, a "204 No Content" response code shall be returned in the response.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.7.

If the feature "ES3XX" is supported, and the NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [5].

If the AMF as NF service consumer is not able to handle the notification but knows by implementation specific means that another AMF is able to handle the notification, it shall reply with an HTTP "307 Temporary redirect" response pointing to the URI of the new AMF. If the AMF is not able to handle the notification but another unknown AMF could possibly handle the notification, it shall reply with an HTTP "404 Not found" error response.

If the PCF receives a "307 Temporary redirect" response, the PCF shall resend the failed policy update notification request using the received URI in the Location header field as Notification URI. Subsequent policy update notifications, triggered after the failed one, shall be sent to the Notification URI provided by the NF service consumer during the corresponding policy association creation/update.

If the PCF becomes aware that a new AMF is requiring notifications (e.g. via the "404 Not found" response, via Namf\_Communication service AMFStatusChange Notifications, see 3GPP TS 29.518 [14], or via link level failures), and the PCF knows alternate or backup IPv4, IPv6 Addess(es) or FQDN(s) where to send Notifications (e.g. via "altNotifIpv4Addrs", "altNotifIpv6Addrs" or "altNotifFqdns" attributes received when the policy association was created, via AMFStatusChange Notifications or via the Nnrf\_NFDiscovery Service specified in 3GPP TS 29.510 [13] (using the service name and GUAMI obtained during the creation of the subscription) to discover the other AMFs within the AMF set), the PCF shall exchange the authority part of the corresponding Notification URI with one of those addresses and shall use that URI in any subsequent communication.

If the PCF received a "404 Not found" response, the PCF should resend the failed policy update notification request to that URI.

If the feature "DNNReplacementControl" is supported and the AMF received the update of the SMF selection information within the "smfSelInfo" attribute in the request, the AMF shall apply the updated SMF selection information to the new PDU Sessions only, i.e. already established PDU Sessions are not affected.

If the "AMInfluence" feature is supported, the PCF determines that the access and mobility policies may be influenced by the traffic of a PDU session(s) based on an AF request, UDR notification or other internal policies, and local operator policies indicate the PCF for the UE shall subscribe with the PCF for the PDU session for established/terminated PDU session(s) event notifications, the PCF for the UE shall provision/update the AMF with the PCF for the UE information within the "pcfUeInfo" attribute and the complete list of S-NSSAI and DNN combinations within the "matchPdus" attribute. The AMF shall update the affected established PDU sesssions, forwarding the received PCF for the UE information for the PDU session(s) matching the new S-NSSAI and DNN combination(s), and removing the previously provided PCF for the UE information for the PDU session(s) matching the removed S-NSSAI and DNN combination(s) as defined in 3GPP TS 29.502 [31].

When the feature "AMInfluence" is supported, and the SBA binding indication information for the PCF instance changes, the PCF may update the previously provided information in the AMF. The AMF shall apply the updated PCF callback information to the new PDU Sessions only, i.e., already established PDU sessions are not affected.

NOTE 1: Alternatively, the PCF for the UE can subscribe with the BSF to notifications about the PCF binding information creation and/or termination for the affected PDU session(s) as described in 3GPP TS 29.521 [30].

If the PCF changed the Service Area Restrictions as part of the policy update, it shall send notifications to any NF Service Consumer(s) (e.g. AF) that have subscribed to the related event by using the Npcf\_AMPolicyAuthorization service (see TS 29.534 [26]) and/or the Npcf\_EventExposure service (see TS 29.523 [28]).

If the feature "5GAccessStratumTime" is supported and the PCF receives the access stratum time distribution parameters or removal of the access stratum time distribution parameters from the TSCTSF as defined in 3GPP TS 29.534 [26], the PCF may provision, update or remove the 5G access stratum time distribution parameters by provisioning the "asTimeDisParam" attribute as defined in clause 4.2.2.3.6. The AMF shall provision the 5G access stratum time distribution parameters to the NG-RAN when receiving it from the PCF.

If the feature "RFSPValidityTime" is supported and the PCF determines to modify the RFSP index value in use to indicate EPC/E-UTRAN access is prioritized over 5GS access, the PCF shall send to the AMF the RFSP Index value within the "rfsp" attribute and may provide, based on operator policies, the validity time for the indicated RFSP Index value within the "rfspValTime" attribute, as defined in clause 4.2.2.3.2.

If the feature "NetTimeSyncStatus" is supported and the PCF receives the clock quality detail level and optionally the clock quality acceptance criteria parameters from the TSCTSF as defined in 3GPP TS 29.534 [26], the PCF may update the clock quality detail level and if applicable the clock quality acceptance criteria parameters by provisioning the "asTimeDisParam" attribute as defined in clause 4.2.2.3.6. The AMF shall provision the clock quality detail level and the clock quality acceptance criteria parameters to the NG-RAN when receiving it from the PCF.

If the "NetSliceUsageCtrl" feature is supported, the PCF may check whether any of the S-NSSAI(s) of the UE's Allowed NSSAI are on-demand S-NSSAI(s) and subject to network slice usage control. If it is the case, the PCF may provision/update/remove via the Npcf\_AMPolicyControl\_UpdateNotify request the network slice usage control information (e.g., slice deregistration inactivity timer) within the "sliceUsgCtrlInfoSets" attribute of the PolicyUpdate data structure for one or more of these S-NSSAI(s).

NOTE 2: In this release of the specification, network slice usage control information provisioning/update/removal by the PCF is not supported in roaming scenarios.

If the "NetSliceRepl" feature is supported, then:

- when the PCF detects that one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI become(s) unavailable for a UE based on an OAM trigger, a received NWDAF notification or PCF internal triggers, the PCF may indicate this to the AMF by providing the "snssaiReplInfos" attribute containing these impacted S-NSSAI(s), and for each impacted S-NSSAI, the corresponding status information set to "UNAVAILABLE" and optionally an Alternative S-NSSAI; and

- when the PCF becomes aware that one or more S-NSSAI(s) of the UE's Allowed NSSAI and/or Partially Allowed NSSAI become(s) available again, the PCF may indicate this to the AMF also by providing the "snssaiReplInfos" attribute containing these impacted S-NSSAI(s), and for each impacted S-NSSAI, the corresponding status information set to "AVAILABLE".

NOTE 3: When the NWDAF is used to report slice load level information, the PCF can deduce if the S-NSSAI(s) is not available or is available again by obtaining slice load level information related to a PCF-provided threshold from the NWDAF as described in 3GPP TS 29.520 [34].

NOTE 4: The PCF can provide within the "snssaiReplInfos" attribute both information about S-NSSAI(s) that are currently unavailable and information about S-NSSAI(s) that are available again.

If the "AfNetSliceRepl" feature is supported, then:

- when the PCF receives the requested Network Slice Replacement requirements related information, the PCF shall indicate this to the AMF by providing the "SLICE\_REPLACE\_OUTCOME" PCRT within the "RequestTrigger" attribute, the "afSliceReplReq" attribute;















\*\*\* Fourth Change \*\*\*

## 5.8 Feature negotiation

The optional features in table 5.8-1 are defined for the Npcf\_AMPolicyControl API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [5].

Table 5.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| 1 | SliceSupport | Indicates the support of AM policies differentiation based on the awareness of the allowed NSSAI. |
| 2 | PendingTransaction | This feature indicates support for the race condition handling as defined in 3GPP TS 29.513 [7]. |
| 3 | UE-AMBR\_Authorization | Indicates the support of UE-AMBR control by the PCF in the serving network. |
| 4 | DNNReplacementControl | Indicates the support of DNN replacement control. |
| 5 | MultipleAccessTypes | Indicates the support of AM policies for the multiple (i.e. 3GPP and non-3GPP) access and RAT types where the served UE is camping. |
| 6 | WirelineWirelessConvergence | Indicates the support of Wireline and Wireless access convergence. |
| 7 | ImmediateReport | Indicates the support of the current applicable values report corresponding to the policy control request triggers for policy update notification. |
| 8 | ES3XX | Extended Support for 3xx redirections. This feature indicates the support of redirection for any service operation, according to Stateless NF procedures as specified in clauses 6.5.3.2 and 6.5.3.3 of 3GPP TS 29.500 [5] and according to HTTP redirection principles for indirect communication, as specified in clause 6.10.9 of 3GPP TS 29.500 [5]. |
| 9 | UE-Slice-MBR\_Authorization | Indicates the support of UE-Slice-MBR control by the PCF in the serving network. |
| 10 | AMInfluence | Indicates the support of the alternative mechanism to support informing the PCF for the UE of PDU session(s) established/terminated events via the delivery of the PCF for the UE information necessary for the PCF for the PDU session to send notifications on PDU session(s) established/terminated events through the AMF and the SMF. |
| 11 | EneNA | This feature indicates the support of NWDAF data reporting. |
| 12 | TargetNSSAI | Indicates the support for RFSP Index associated with the Target NSSAI. |
| 13 | 5GAccessStratumTime | This feature indicates the support of 5G acess stratum time distribution parameters provisioning. |
| 14 | FeatureRenegotiation | This feature indicates the support of feature renegotiation during the update of a policy association triggered by UE mobility with AMF change. |
| 15 | NetSliceRepl | This feature indicates that both UE and AMF support of the network slice replacement functionality as part of the enhancements of the network slicing functionality.  The following functionalities are supported:  - Support the network slice replacement information management based on the UE capability |
| 16 | RFSPValidityTime | This feature indicates the support of the provisioning of a validity time for the RFSP Index value that indicates the EPC/E-UTRAN access is prioritized over 5GS access. |
| 17 | NetTimeSyncStatus | This feature indicates the support of network timing synchronization status and reporting. This feature requires the support of the 5GAccessStratumTime feature as well. |
| 18 | NetSliceUsageCtrl | This feature indicates the support of the network slice usage control functionality as part of the enhancements of the network slicing functionality.  The following functionalities are supported:  - Support the provisioning by the PCF of the network slice usage control information (e.g., slice deregistration inactivity timer value).  This feature requires the support of the "SliceSupport" and/or "DNNReplacementControl" features. |
| 19 | PartNetSliceSupport | This feature indicates the partial network slice support in a Registration Area functionality as part of the enhancements of the network slicing functionality.  The following functionalities are supported:  - Support the reporting of the changes in the Partially Allowed NSSAI, S-NSSAI(s) rejected partially in the RA, Rejected S-NSSAI(s) in the RA and/or the Pending NSSAI to the PCF. |
| 20 | SLAMUP | This feature indicates the support of the provisioning to the AMF of the CHF information of the CHF selected by the PCF. |
| 21 | RatTypeChange | This feature indicates the support of provisioning the AM policies to the UE for the change in the RAT type within the same Access type. |
| 22 | AfNetSliceRepl | This feature indicates the support of the enhancements to support AF requested Network Slice Replacement services.  The following functionalities are supported:  - Support the provisioning and management of the AF requested Network Slice Replacement requirements. |
| 23 | Energy | Indicates the support of reporting the subscribed Energy Saving Indicator value changes. |
| 24 | CHFGroup | This feature indicates the support of the CHF Group ID handling for the discovery of the CHF. |
|  |  |  |